FOR SUBMISSION TO NATURE

Terrestrial Origin of the Igast Objects

Paul D. Lowman, Jr.

John A. O'Keefe

This paper presents evidence for the terrestrial origin of the objects which allegedly fell from the sky at Igast, Estonia, in 1855[1].

The Igast objects have been of interest in relation to the tektite problem, because if they could be proven to be of extraterrestrial origin, they would be the first such material with the chemical composition of a tektite. It was suggested by us[2] that, since much of the Igast material referred to in published papers could be proven spurious, the genuine Igast specimens should be re-examined. Through the courtesy of Dr. Max Hey and Mr. Malcolm Frost of the British Museum, it was recently possible to make such a re-examination of specimen No. 36271 (British Museum number).

The specimen, which is part of the British Museum collection of pseudo-meteorites and is so labeled, weighs about 1.5 grams. It is brownish lavender in most places, but is reddish brown in a zone a few millimeters deep along one side and around some of the vesicles. The material is chiefly vesicular glass, but under the microscope can be seen to grade into a sintered mass of quartz grains. Several individual quartz grains and clusters of quartz grains are present.

The specimen examined is definitely one of the original ones collected by Grewingk and Schmidt [1864] as shown by its resemblance to their

description and by the Museum label, which shows that it was acquired in 1864, directly from Grewingk. (In the 1880's the Russian dealer J. Siemaschko distributed specimens labeled Igast which were not acknowledged by Grewingk and were entirely different in their characteristics). However, the specimen was completely fused in the earth's atmosphere rather than being superficially melted, as are meteorites. Evilence for this conclusion consists of the presence of abundant iron oxide throughout the specimen, and the absence of a fusion crust. There is a smooth quenched skin which might be mistaken for a fusion crust, but is clearly not one because it grades into, and is identical with, the smooth surface lining vesicles.

This Igast specimen closely resembles the pseudoscoria formed by burning coal and lignite beds, such as described by Lydon[3] and others. It particularly resembles material discovered by Elbert A. King in Eocene sediments of the coastal plain near Huntsville, Texas, and shown by field relations to have been formed by burning lignite seams. Such material is much more common than formerly realized, since numerous specimens have recently been recovered from Iowa and surrounding states in a search for possible extraterrestrial materials resembling the Igast objects (Table 1).

It is concluded that the Igast objects are of terrestrial origin, and are probably pseudoscorias formed by burning coal beds.

We are indebted to Dr. Max Hey and Mr. Malcolm Frost of the British Museum for their cooperation, to Mr. Elbert A. King of the Manned Spacecraft Center (N.A.S.A.) for bringing the Texas pseudoscorias to our attention,

to Mr. Poul Nielsen of Missouri Valley, Iowa, and Mrs. Darryl Cooper of Blencoe, Iowa, for specimens, and to the U. S. Department of Agriculture for its collaboration in the search.

Table 1

	Igast [1]	Iowa W-9	Iowa W-21
SiO_2	80.9	63.4	67.3
Al_2O_3	9.9	16.5	19.0
Fe_2O_3	2.4	1.8	1.0
FeO		5.6	3.2
MgO	1.6	3.2	2.6
CaO	0.75	2.8	0.08
Na_2O	0.76	1.1	0.74
K_2O	3.1	2.5	4.7
H_2O-	n.d.	0.35	0.12
H_2O+	n.d.	1.4	0.61
TiO_2	n.d.	0.78	0.57
P_2O_5	n.d.	0.24	0.15
MnO	0.20	0.21	0.04
CO_2	n.d.	0.07	<0.05
Ignition loss	0.32	-	-

Analyses of Iowa pseudoscorias by Rapid Rock Analysis Section of the U.S. Geological Survey, Leonard Shapiro, Chief.